(12) UK Patent Application (19) GB (11) 2 316 526 (13) A

(43) Date of A Publication 25.02.1998

(21) Application No 9713684.0

(22) Date of Filing 30.06.1997

(30) Priority Data
(31) 96035471 (32) 24.08.1996 (33) KR

(51) INT CL[6]
G11B 31/00 , G09B 5/06

(52) UK CL (Edition P)
G5R RAB
G5G G13 G5P G506

(56) Documents Cited
GB 2303958 A EP 0479188 A1 EP 0477815 A1
US 4639225 A
"IEE Colloquium on Human-Computer Interface Design for Multimedia Electronic Book" (Digest No. 1995/ 038), IEE

(58) Field of Search
UK CL (Edition O) G5G G13 , G5R RAA RAB RAC RAD RCA
INT CL[6] G09B 5/06 , G11B 23/44 31/00 33/06
Online: WPI

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(54) Portable electronic book

(57) A portable electronic read instrument is described designed for the exclusive reproduction of the contents of books stored in an auxiliary memory as character and sound data. The instrument includes a CPU 210, a drive circuit 214, 216 for retrieving book data from the auxiliary memory, a main memory 212 for storing the book data, a display 218 for displaying character data from the stored book data, a loudspeaker 220 for reproducing sound data from the stored book data and one or more search keys 224. The CPU 210 is programmed to control the drive circuit 214, 216, main memory 212, the display 218 and the loudspeaker 220 so as to display or reproduce selected data in accordance with the operation of the search keys 224.

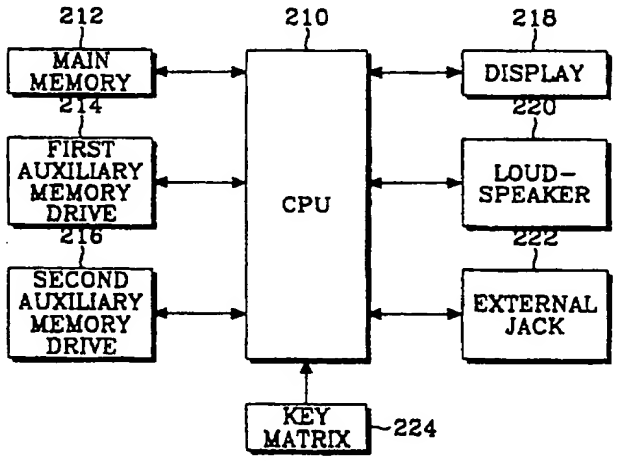

Fig. 2

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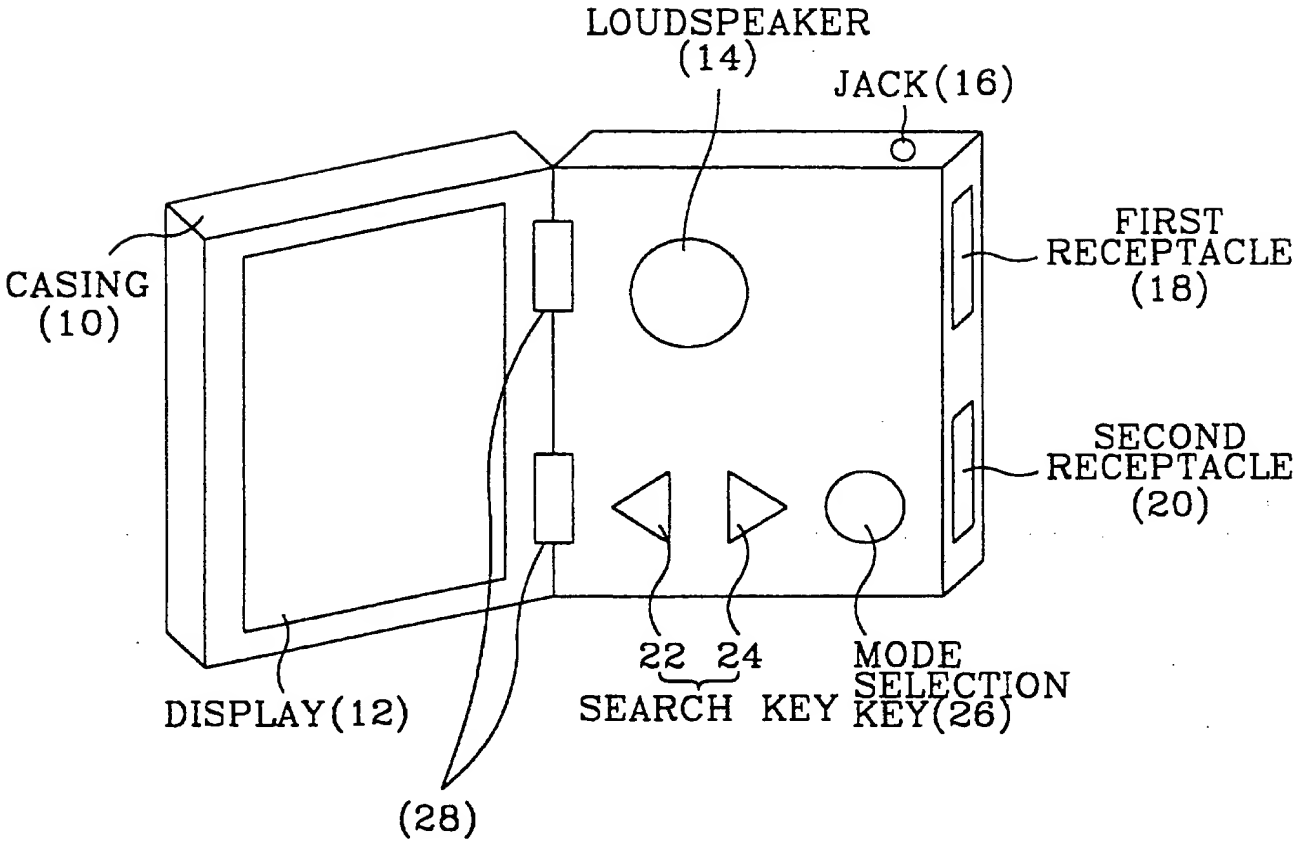
LOUDSPEAKER
(14)
JACK(16)
CASING
(10)
FIRST
RECEPTACLE
(18)
SECOND
RECEPTACLE
(20)
22 24
SEARCH KEY
MODE
SELECTION
KEY(26)
DISPLAY(12)
(28)

Fig. 1

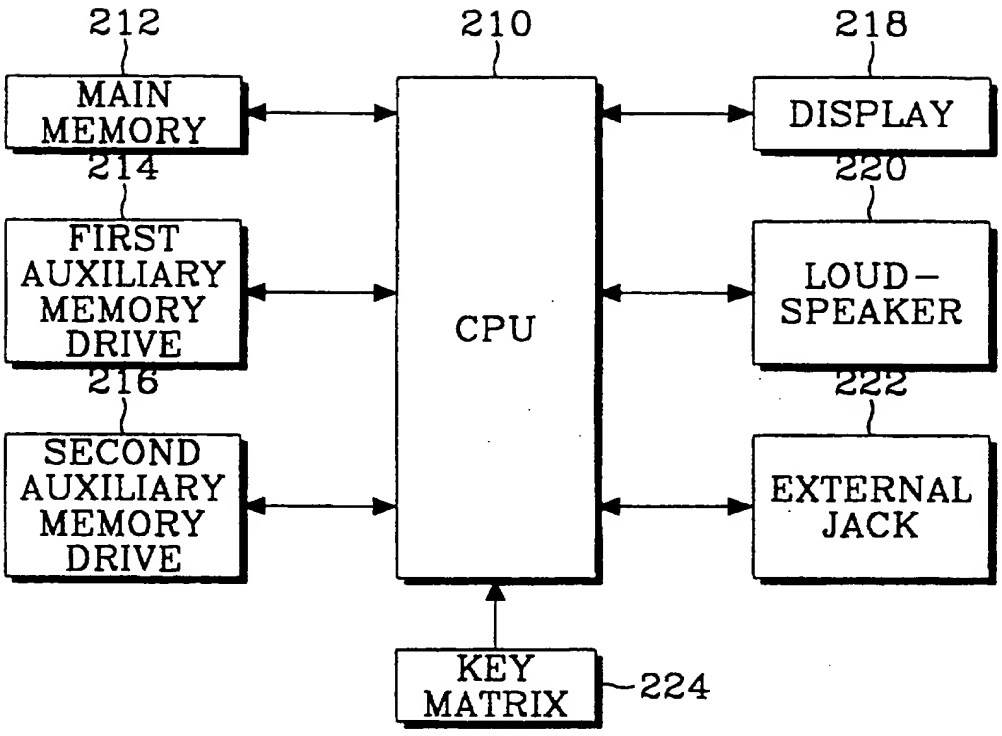
212
MAIN MEMORY
214
FIRST AUXILIARY MEMORY DRIVE
216
SECOND AUXILIARY MEMORY DRIVE
210
CPU
218
DISPLAY
220
LOUD-SPEAKER
222
EXTERNAL JACK
KEY MATRIX
224

Fig. 2

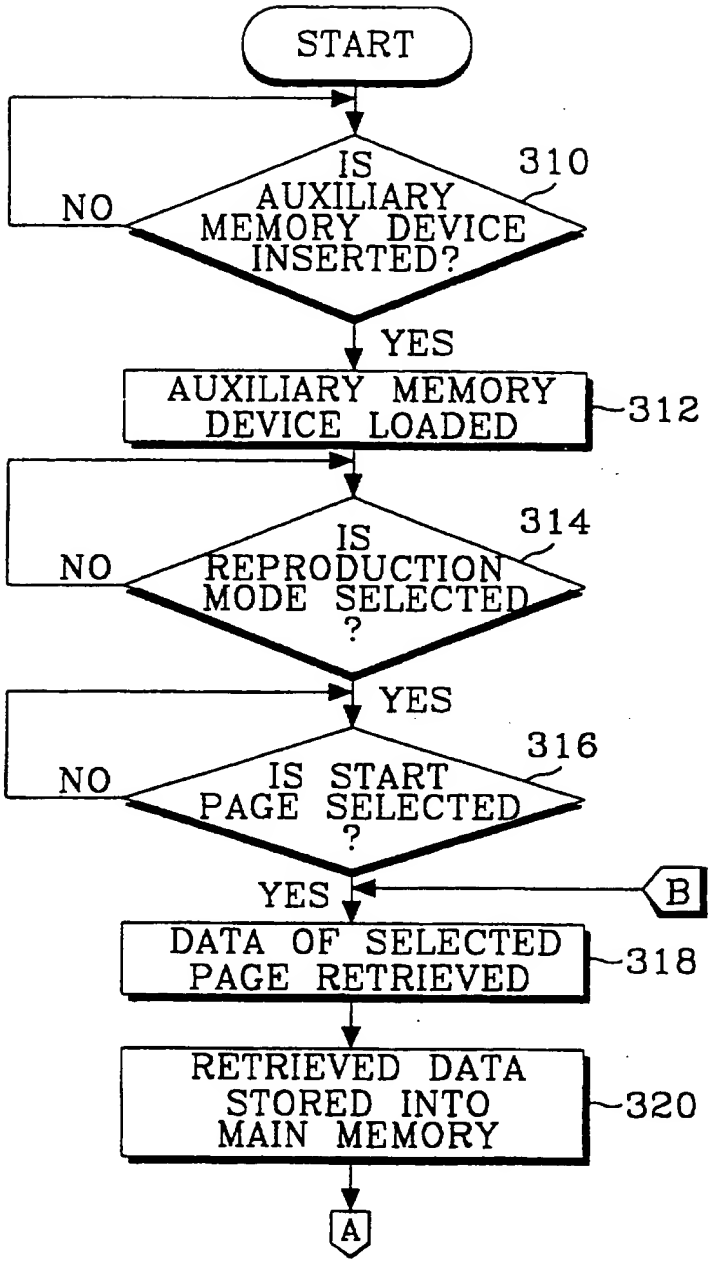
START
IS AUXILIARY MEMORY DEVICE INSERTED?
310
NO
YES
AUXILIARY MEMORY DEVICE LOADED
312
IS REPRODUCTION MODE SELECTED ?
314
NO
YES
IS START PAGE SELECTED ?
316
NO
YES
B
DATA OF SELECTED PAGE RETRIEVED
318
RETRIEVED DATA STORED INTO MAIN MEMORY
320
A

Fig. 3A

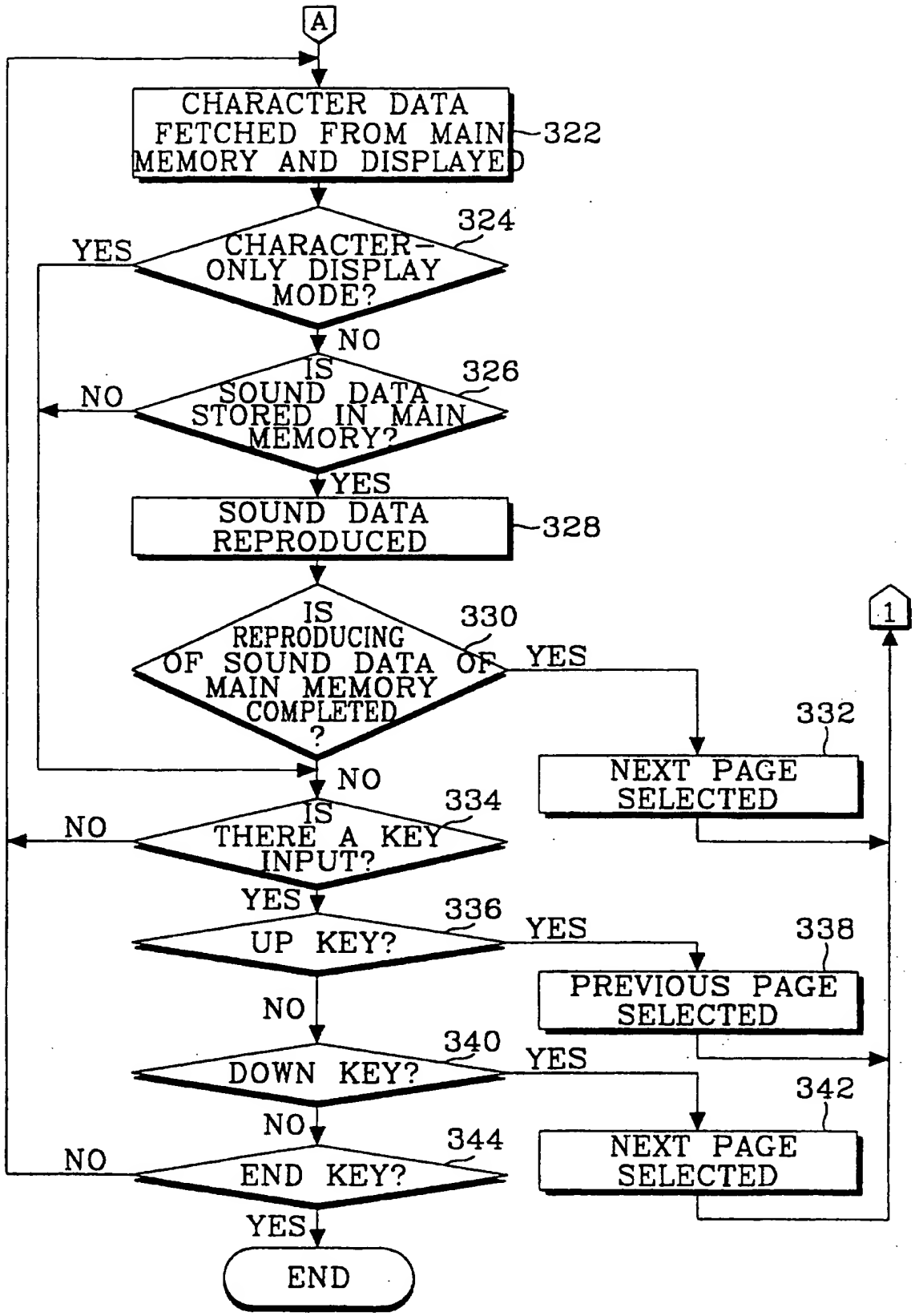
A
CHARACTER DATA FETCHED FROM MAIN MEMORY AND DISPLAYED
322
CHARACTER-ONLY DISPLAY MODE?
324
YES
NO
IS SOUND DATA STORED IN MAIN MEMORY?
326
NO
YES
SOUND DATA REPRODUCED
328
IS REPRODUCING OF SOUND DATA OF MAIN MEMORY COMPLETED ?
330
YES
NO
1
NEXT PAGE SELECTED
332
IS THERE A KEY INPUT?
334
NO
YES
UP KEY?
336
YES
PREVIOUS PAGE SELECTED
338
NO
DOWN KEY?
340
YES
NEXT PAGE SELECTED
342
NO
END KEY?
344
NO
YES
END

Fig. 3B

2316526

PORTABLE ELECTRONIC READ INSTRUMENT

Background of the Invention

Typically, knowledge is obtained from books by reading or by listening to recordings of the books on magnetic tapes. Recently, it has been possible to read books using a notebook or personal computer, which reproduces in characters and sounds the contents of the books stored in auxiliary memories such as floppy disks or CD-ROMs.

However, the conventional ways of reading books have various inherent drawbacks. For example, it is very inconvenient for a traveller to take with him many books to read. Also, cassette recorders only provide sound, so it is difficult for him to access a desired section of the magnetic tape. Moreover, it is very difficult to carry around a personal computer to read books and although it is possible to use a notebook computer to read books, it is inconvenient if its only purpose is to read books.

Therefore, it is an object of the present invention to address these problems.

Summary of the Invention

According to the present invention, there is provided a portable electronic read instrument for exclusively reproducing the contents of books stored in an auxiliary memory as character and sound data, comprising a CPU, a drive circuit for retrieving book data from the auxiliary memory, a main memory for storing the book data, means for displaying character data from the stored book data, means for reproducing sound data from the stored book data and one or more search keys, in which the CPU is adapted to control the drive circuit, main memory, the means for displaying character data and the means for reproducing sound data so as to display or reproduce selected data in accordance with the operation of the search keys.

The means for displaying the character data comprises a visual display and the means for reproducing the sound data comprises a loudspeaker. The auxiliary memory may include a CD-ROM or a floppy disk and the drive circuit may comprise first and second drive circuits for respectively driving the CD-ROM and the floppy disk.

The instrument may further include a jack for communicating the sound data to an external loud speaker.

The present invention also extends to a method of operating a portable electronic read instrument for exclusively reproducing the contents of books stored in an auxiliary memory as character and sound data, comprising:

setting an operational mode as character-only display mode, sound-only reproducing mode or character and sound reproducing mode;

selecting a start page of a book stored in the auxiliary memory;

retrieving the book data of the start page from the auxiliary memory;

storing the retrieved book data in the main memory;

displaying the character data from the book data if the mode selected is a character display mode; and

reproducing the sound data from the book data if the mode selected is a sound reproducing mode.

Reproducing the sound data may include displaying the sound data as characters.

The method may further comprise searching the book data according to the operation of a search key. The book data of the following page is reproduced after the book data of the selected page is reproduced.

Brief Description of the Drawings

The present invention will now be described by way of example with reference to the accompanying drawings in which:

Fig. 1 is a schematic perspective view of the portable electronic read instrument;

Fig. 2 is a block diagram illustrating the functional structure of the instrument shown in Fig. 1; and

Figs. 3A and 3B are a flow chart showing the control of the functions of the instrument shown in Figs. 1 and 2.

Detailed Description of the Preferred Embodiment

Referring to Fig. 1, provided in a casing 10 consisting of two parts are a display 12 for displaying character images, and loudspeaker 14 for producing sounds and external jack 16 for communicating sound data to an external loudspeaker such as an earphone. Also provided are a first socket 18 for a CD-ROM and a second socket 20 for a floppy disk. Search keys 22 and 24 are installed to allow selection of a page to read. A mode selection key 26 is used to select a mode for reproducing book data. There may be three reproduction modes, such as character-only display mode, sound-only reproducing mode and character and sound reproducing mode. Hinges 28 are shown to connect the two parts of the casing 10.

As shown in Fig. 2, a CPU 210 controls all the functions of the instrument according to a control program. A main memory 212 stores the book data retrieved from the auxiliary memory one page at a time. A first auxiliary memory drive 214 drives a CD-ROM to retrieve the book data transferred to the CPU 10. A second auxiliary memory drive 216 drives a floppy disk to retrieve the book data transferred to the CPU 10. The display 218 displays the book data in characters under the control of the CPU 10. The loudspeaker 220 reproduces vocal sounds corresponding to the book data. The external jack 222 connects the sound data to an external loudspeaker such as an earphone. A key matrix 224 comprises search keys to select a page of the book data to read and a mode selection key to select a mode for reproducing the book data.

Referring to Fig. 3A, in step 310, the CPU 210 detects

whether a CD-ROM or floppy disk is inserted into the first or second sockets 18 or 20, where they are driven respectively by the first or second auxiliary memory drive 214 under the control of the CPU 210. Detecting the insertion of the auxiliary memory device, the CPU 210 loads the auxiliary memory device in the auxiliary memory drive in step 312. In step 314, the CPU 210 detects a key input from the key matrix 224 to select an operational mode for reproducing the book data. The operational modes are character-only display mode and character/sound reproducing mode. The operational mode is selected by the mode selection key 26.

Subsequently, the CPU 210 detects a key input from the key matrix 224 to select a start page of the book data in step 316. The start page is selected by the up or down search key 22 or 24. The up key 22 selects the page previous to the presently reproduced page, and the down key 24 the page following the presently reproduced page. In step 318, the CPU 210 retrieves the book data of the selected page from the auxiliary memory, the mechanism of which is well known, and therefore its detailed description is omitted. The retrieved book data is loaded in the main memory 212 in step 320.

Subsequently, referring to Fig. 3B, the CPU 210 displays the character data retrieved from the main memory on the display 218. The mechanism for reproducing the book data is the same with that of a conventional computer. Then, in step 324, it is determined whether the reproduction mode selected in step 314 is the character-only display mode. If it is not, the mode is determined to be the character and sound reproducing mode, and the CPU proceeds to step 326, where it is determined whether the main memory 212 stores sound data together with character data. If so, the sound data is fetched from the main memory 212 and output through the loudspeaker 220 or the external jack 222 in step 328. The outputted sounds correspond with the character data displayed in step 322. The mechanism of the sound

reproduction is the same as that of a compact disk. In step 330, it is determined whether the sound data loaded in the main memory is completely reproduced. If so, the next page is selected in step 332. Finally, the process returns to step 318 as shown in Fig. 3A. Otherwise, the process goes to step 334.

Likewise, when the character-only display mode is determined to be selected in step 324 and the sound data is not loaded in the main memory in step 326, the process also goes to step 334, where it is periodically checked if there is a key input. If there is no key input, the process returns to step 322.

However, if a key input is detected in step 322, the key input is analyzed in steps 336, 340 and 344. When the key input is determined to be the up key 22 in step 336, the process goes to step 338 to select the previous page returning to step 318 as shown in Fig. 3A. When the key input is determined to be the down key 24 in step 340, the process goes to step 342 to select the following page, returning to step 318 as shown in Fig. 3A. Otherwise, when the key input is determined to be the end key in step 344, the process ends.

Thus, the portable electronic read instrument uses an auxiliary memory such as floppy disk or CD-ROM to store a large amount of both character and sound data, is designed for exclusively reproducing the stored data and therefore provides a traveller with a much more convenient way to enjoy a great number of books stored in CD-ROMs. In addition, the book data may be randomly searched page by page, thus providing a convenient tool especially for improving language skill.

CLAIMS

1. A portable electronic read instrument for exclusively reproducing the contents of books stored in an auxiliary memory as character and sound data, comprising a CPU, a drive circuit for retrieving book data from the auxiliary memory, a main memory for storing the book data, means for displaying character data from the stored book data, means for reproducing sound data from the stored book data and one or more search keys, in which the CPU is adapted to control the drive circuit, main memory, the means for displaying character data and the means for reproducing sound data so as to display or reproduce selected data in accordance with the operation of the search keys.

2. A portable electronic read instrument according to claim 1 in which the means for displaying the character data comprises a visual display and the means for reproducing the sound data comprises a loudspeaker.

3. A portable electronic read instrument according to claim 1 or claim 2 in which the auxiliary memory includes a CD-ROM or a floppy disk.

4. A portable electronic read instrument according to claim 3 in which the drive circuit includes first and second drive circuits for respectively driving the CD-ROM and the floppy disk.

5. A portable electronic read instrument according to any preceding claim further including a jack for communicating the sound data to an external loud speaker.

6. A portable electronic read instrument for exclusively reproducing the contents of books stored in an auxiliary memory as character and sound data, substantially as described herein with reference to and/or as illustrated in the accompanying drawings.

7. A method of operating a portable electronic read instrument for exclusively reproducing the contents of books stored in an auxiliary memory as character and sound data, comprising:

setting an operational mode as character-only display mode or sound-only reproducing mode or character and sound reproducing mode;

selecting a start page of a book stored in the auxiliary memory;

retrieving the book data of the start page from the auxiliary memory;

storing the retrieved book data in the main memory;

displaying the character data from the book data if the mode selected is a character display mode; and

reproducing the sound data from the book data if the mode selected is a sound reproducing mode.

8. A method according to claim 7 in which reproducing the sound data includes displaying the sound data as characters.

9. A method according to claim 7 or claim 8 further comprising searching the book data according to operation of a search key.

10. A method according to any one of claims 7-9 in which the book data of the following page is reproduced after the book data of the selected page is reproduced.

11. A method of operating a portable electronic read instrument for exclusively reproducing the contents of books stored in an auxiliary memory as character and sound data, substantially as described herein with reference to and/or as illustrated in the accompanying drawings.

The Patent Office

Application No:	GB 9713684.0	**Examiner:**	Donal Grace
Claims searched:	1 to 11	**Date of search:**	27 August 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): G5G (G13) G5R (RAA, RAB, RAC, RAD, RCA)

Int Cl (Ed.6): G09B 5/06 G11B 23/44, 31/00, 33/06

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X, P	GB 2303958 A	(JAMPOO) see figure 2	1 to 3, 5
X	EP 0479188 A1	(SONY) whole document	1 to 5, 7 to 10
X	EP 0477815 A1	(SONY) whole document	1 to 5, 7 to 10
X	US 4639225	(WASHIZUKA) column 2 lines 6-12	1, 2
X	"IEE Colloquium on Human-Computer Interface Design for Multi , published 1995, IEE, J M Bryant, "The electronic book - a user's wishlist", also published on the Internet at www.luna.co.uk/~jbryant/pages/ebook		1 to 3

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.